



**UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/358,940	07/22/99	LEE	W 3028.1US-(96

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IM22/0212

EXAMINER

PEREZ RAMOS, V

ART UNIT

PAPER NUMBER

1765

DATE MAILED:

02/12/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/358,940	Applicant(s) LEE ET AL.	
	Examiner Vanessa Perez-Ramos	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 November 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- | | |
|---|--|
| 15) <input type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 20) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 and 6-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cathey (U.S. 5,300,463).

In regard to claims 1-4 and 6-7, Cathey discloses an etchant solution (col. 2, line 43) which selectively etches BPSG over TEOS (col. 2, lines 54-59), comprising acetic acid (col. 2, line 45) and HF (col. 2, line 45). Furthermore, Cathey discloses that the etchant solution comprises 49% HF in water (col. 2, lines 46-47).

Cathey does not disclose that the organic acid (acetic acid) is in a volumetric ratio of 10:1 to 500:1 with the fluoride-containing solution. Cathey's solution contains 60 ml of acetic acid, and 30 ml of HF, resulting in an organic acid:fluoride ratio of 2:1. However, Cathey also discloses (col. 2, lines 29-36) that, other things being equal, a solution with a higher HF content would exhibit a higher etch rate.

Therefore, it is the Examiner's position that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Cathey's solution by utilizing a volumetric ration in the 10:1 to 500:1 range, because the variation of process parameters is obvious and expected from one skilled in the art, and, furthermore, because, as Cathey discloses, a higher HF content in the solution would result in a higher etch rate, and high etch rates are highly desirable during semiconductor manufacturing.

In regard to claims 8-14, Cathey does not disclose a BPSG to TEOS selectivity ratio in the range of 27:1 to 55:1.

However, it is the Examiner's position that, if Applicant's etchant solution comprising an organic acid and a fluoride-containing solution provides a selectivity ratio in the above mentioned range, then Cathey must also provide the same BPSG to TEOS selectivity ratio, as Cathey's etchant solution is similar to Applicant's claimed solution.

In regard to claim 15, Cathey does not disclose the use of ammonium fluoride as the fluoride-containing solution.

However, it is the Examiner's position that the use of ammonium fluoride is well known in the art of semiconductor manufacturing, and its use would have been obvious to one skilled in the art at the time of the invention.

Response to Arguments

3. Applicant's arguments filed 11/29/00 have been fully considered but they are not persuasive.

In regard to Applicant's argument that Cathey does not teach the use of an organic acid with a fluoride-containing solution, Applicant is directed to col. 2, lines 43-45, where Cathey discloses his "example etch solution" that comprises HF and acetic acid. Even though Cathey indeed discloses that acetic acid is not a necessary part of his invention, he also discloses that "acetic acid is a known prior art component" and discloses some of the advantages of its use. Furthermore, Cathey does NOT teach away from using acetic acid because, even though it might not be a necessary part of his invention in theory, Cathey indeed chose it to be a part of his invention "in practice", as shown by Cathey's choice of a preferred etchant solution, as

described in col. 2, lines 43-45. Furthermore, Cathey reads on Applicant's claimed invention even though Cathey's etchant solution also comprises a mineral acid, because Applicant's claimed solution is not limited to ONLY the organic acid and HF, and could include a number of other components.

In regard to Applicant's argument that Cathey does not teach the claimed volumetric ratio of HF to acetic acid, and that there would be no motivation or "reasonable expectation of success" by modifying Cathey, and that, furthermore, the Examiner is "improperly applying an "obvious to try" rationale", Cathey himself discloses (col. 2, lines 29-36) that, other things being equal, a solution with a higher HF content would exhibit a higher etch rate. A higher etch rate is extremely desirable in the art, and the possibility of increasing the etch rate of a process is sufficient motivation to modify Cathey by varying the volumetric ratio of etchants. Furthermore, it is the Examiner's position that the variation of process parameters such as the volumetric ratio would have been obvious to and expected from one skilled in the art, with the purpose of finding the best process mode. Last, Applicant has not shown any unusual and unexpected results obtained by performing the process at his claimed ratio that would not have been obtained at any other ratio.

In regards to Applicant's argument that Cathey does not disclose a BPSG to TEOS selectivity ratio in the range of 27:1 to 55:1, the Examiner has recognized this deficiency in previous actions. However, it is the Examiner's position that, if Applicant's etchant solution comprising an organic acid and a fluoride-containing solution provides a selectivity ratio in the above mentioned range, then Cathey must also provide the same BPSG to TEOS selectivity ratio, as Cathey's etchant solution is similar to Applicant's claimed solution.

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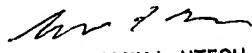
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Perez-Ramos whose telephone number is 703-306-5510. The examiner can normally be reached on Mon-Fri 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-7718 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5665.

Vanessa Perez-Ramos
Examiner
Art Unit 1765

VPR
February 10, 2001


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